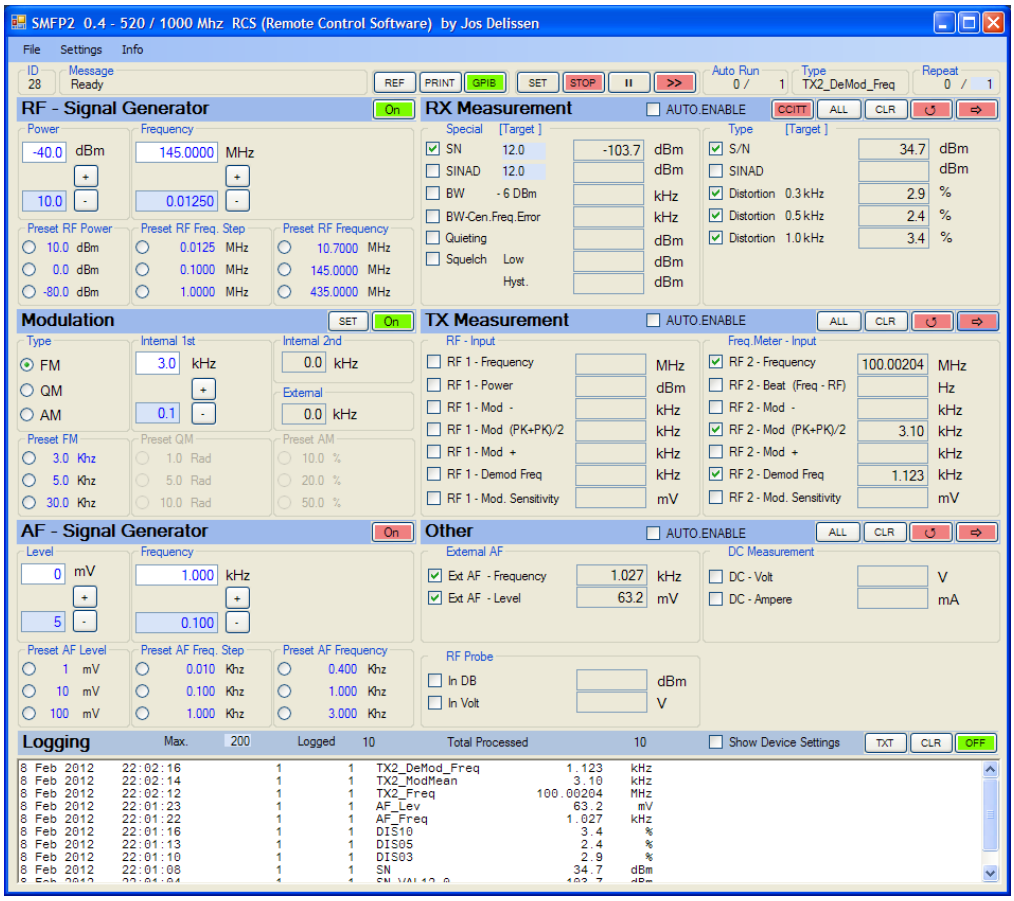
USER MANUAL V1.1

SMFP2
RCS
(Remote Control Software)



A simple tool for complex
Rohde & Schwarz
Mobile Tester

1. Table of Content

2. Introduction

The SMFP2 Remote Control Software (RCS) is designed to easily control the sophisticated SMFP/SMFP2 Mobile Testers from Rohde & Schwarz.

Using software to control these receivers enables

- Usage of these Mobile Testers in computer controlled test systems
- Easy graphical user interface instead of “key driven” complex measuring special functions
- Enhanced measurement capabilities
- Display measured data in Excel or download tot .txt file.
- Easy setup and running of multiple measurements within several ranges (e.g. frequency or modulation depth)

Another advantage is that there is no need for additional programming (e.g. Matlab etc). It is a ready to use program.

Its functionality is split in two parts. With its standard functionality you are able to check if the software is suitable to operate on your computer / OS / GPIB installation. If it works fine you may consider making a registration request to get access to the enhanced functionality.

Standard functionality

- Operating the straight forward Mobile Tester settings, such as
  * RF Frequency, Power and modulation depth (incl. 2nd modulator within SMFP2)
  * AF Frequency and Level

Enhanced functionality (subject to registration)

- Making use of the available receiver measurements:
  * SINAD, S/N and distortion
  * SINAD (12dBm), S/N (12dBm)
  * Bandwidth (-6dBm), Bandwidth Central frequency error
  * Quieting and Squelch measurements

  or Transmitter measurements
  * Frequency and frequency-offset measurements
  * Modulation depth and demodulated frequency
  * Power measurements (including HF Probe)
- Making use of the automated measurement functionality, including single or continuous measurement.

3. How to get it & Installation

The SMFP2 RCS is a Click Once application. Simply stated, a ClickOnce application is any Windows Forms or console application published using the Microsoft ClickOnce technology. ClickOnce applications can be deployed to a computer from a Web location, a network share, or even from a file location such as a CD.

ClickOnce-deployed applications are considered 'low impact', in that they are installed per-user, not per-machine .The application is added to the user's Start menu and to the Add/Remove Programs group in the Control Panel. Unlike other deployment technologies, nothing is added to the Program Files folder and no administrative rights are required for installation.

The SMFP / SMFP2 RCS can be downloaded or launched from the site:

http://www.30dbm.com

The application requires needs .NET Framework. If the proper version is not available on the target system, it will automatically ask to download it during installation.

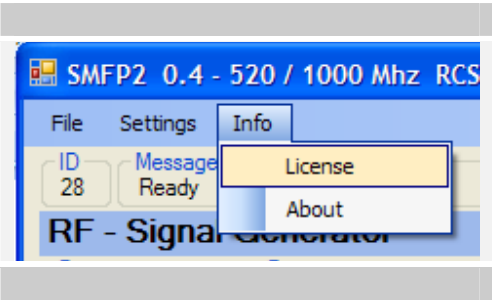
For using the enhanced functionality of the SMFP / SMFP2 RCS you need to be a registered user. A license key can be requested from:

http://www.30dbm.com/Request.aspx

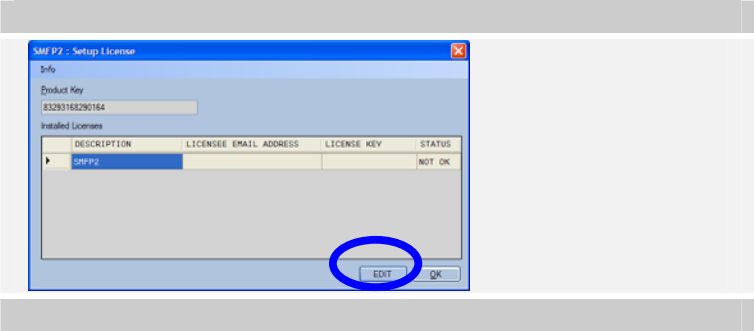
Please make sure to enter the correct equipment used

4. License agreement & Set up

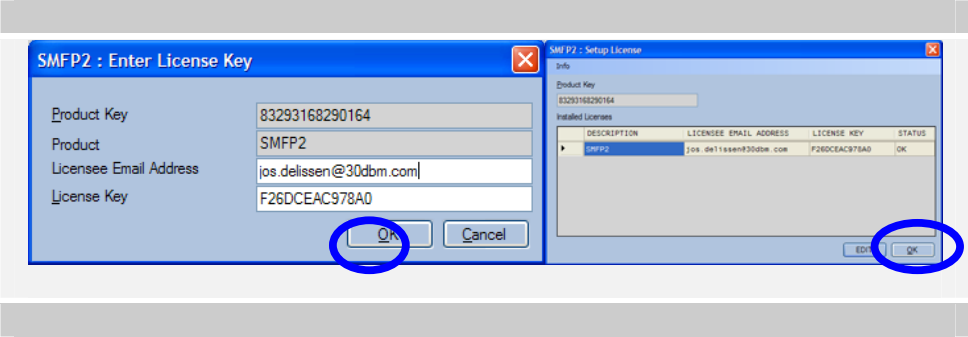
The SMFP / SMFP2 RCS is license protected. To enter a license key



To enter the license key, select the corresponding module and push on “EDIT”.

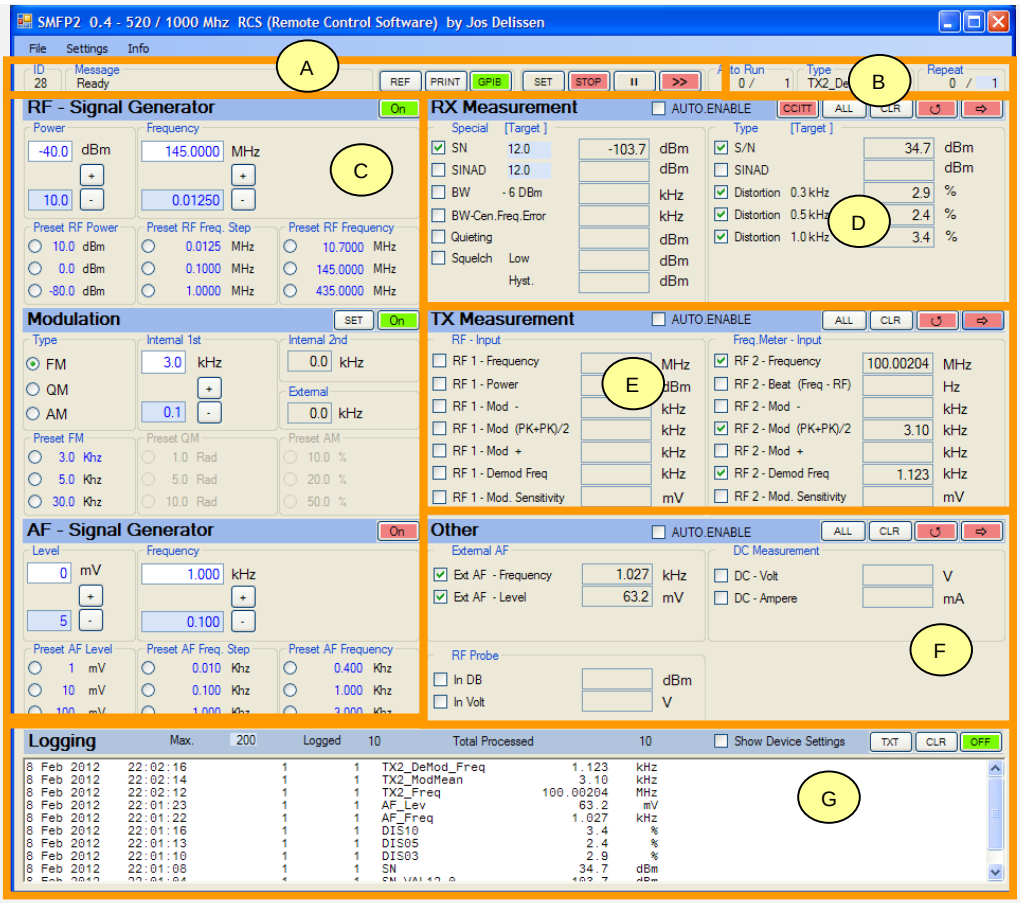


Now the license key can easily be added to your licenses setup, and it will immediately be reflected in the license overview.



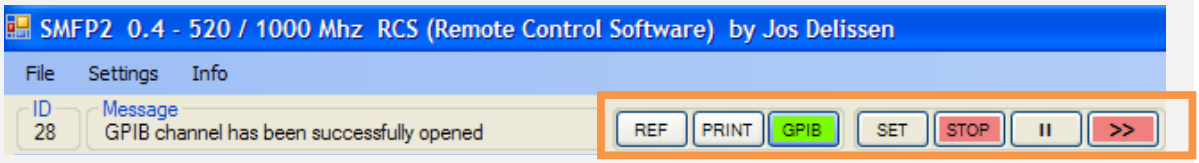
5. Using the SMFP / SMFP2 RCS

5.1. Screen overview



A	General menu section, main functions to start tool (GPIB) and setup automatic runs
B	Information bar about progress of measurements runs.
C	Main setting for RF / AF Signal generator
D	Receiver (RX) measurement section.
E	Transmitter (TX) measurement section.
F	Receiver (RX) measurement section.
G	Logging of measurements done

5.2. General menu section



Overview of all special functions with possibility to sent them to device

Print the screen to a printer

Start / Stop the communication to the device. Only when is button is activated it is possible to use this software with your measuring equipment. When pushed the device is cleared and set to its initial state.

Go to Setup screen of automatic measurements and select e.g. the frequency range to be used to do the measurements

Stops directly any ongoing measurement and internal processes. Any measurements done are stored and can still be used for Excel of download.

Hold function (For usage in automatic or single measurement run) : temporarily interrupts the measurement run(button becomes green). Click it again to proceed measuring (button becomes red again)

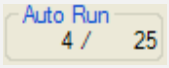
Starts the automatic measurement. Button becomes green (

) when the automatic measurement is active. When the measurement is completed the button 

becomes red again.

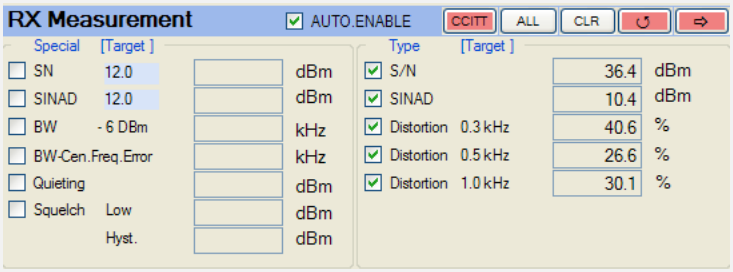
Then also the download to Excel can start automatically (if selected)

5.3. Progress information bar



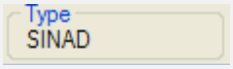
With the “Auto Run” the progress of the automatic runs can be monitored. An automatic run is a full measurement cycle for a combination of measurements. This means the several measurements can be executed in one run (in the example left 25 measurement runs will be processed, of which 4 have been executed)

Within a measurement run several measurements can be sequentially processed. E.g. the following measurements can be done e.g. for a specific device setting.

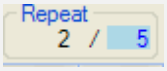


Note : to start an automatic run for a range of frequencies, push 

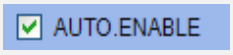
At least one measurement should be selected.



Information about current measurement (in this case SINAD measurement.



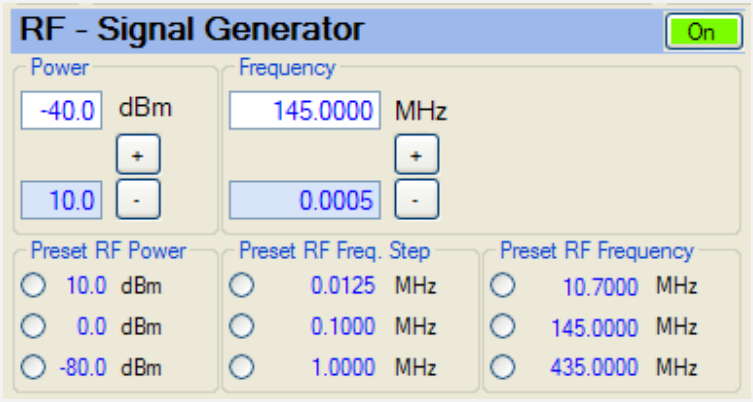
It is possible to repeat a full measurement cycle. Just click on the blue number to adjust the value (default = 1, max 999 repeat cycles). This is especially useful when there is a need for repeating measurements.



The AUTO.ENABLE checkbox is very important for automatic measurements. Only of this check box is set, the measurements selected within the section (in example above). S/N, SINAD, DIS03, DIS05 and DIS10, will be considered in the automatic measurements run. This is also valid for the other sections (TX Measurements / Other Measurements)

5.4. Main settings for RF / AF Signal Generator

5.4.1. Main settings for RF Power and Frequency

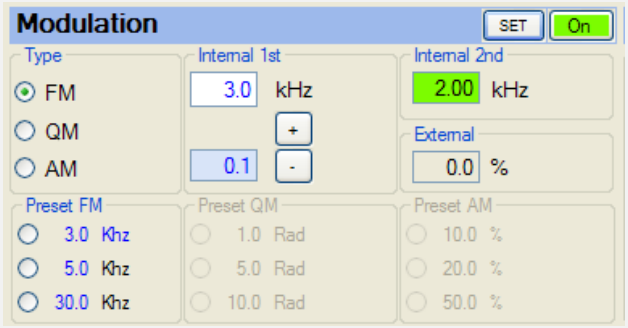


Click on the blue power -40.0 dBm or frequency 145.0000 MHz setting to adjust the characteristic of the RF signal. Use the + and - buttons to add or subtract a predefined step value (as listed in the blue box) . This predefined value can be set as desired. This is done by clicking on it.

E.g.

Only when the On button has been activated, command are set to the SMFP2, enabling you to change the RF power or Frequency

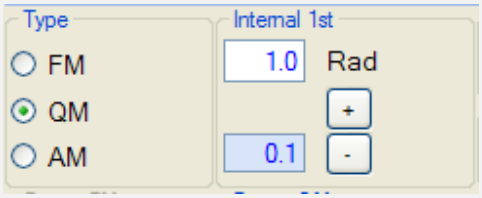
5.4.1. Main settings for RF Modulation

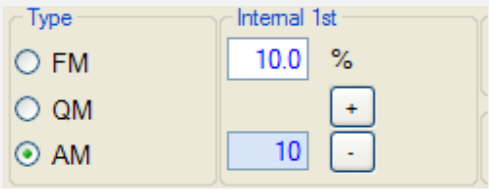


Only when the 

button has been activated, command are set to the SMFP2, enabling you to change the Modulation.

Three modulation types are available, and 2 internal (SMFP2 only) and 1 external modulator

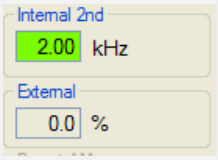




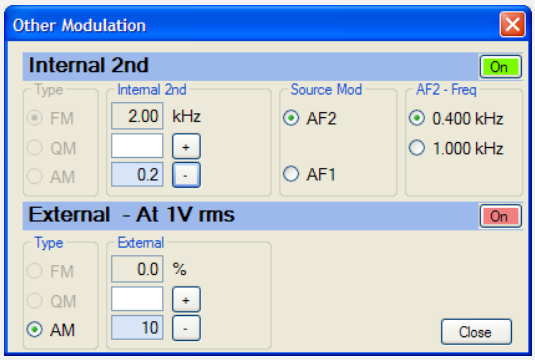
This modulation "Type" setting determines

- For RX measurements , the type of modulation which is used in the generated RF signal or
- For TX measurements, the demodulation type (FM / QM / AM)

The "1st modular" value can be set directly from the screen. Depending on the selected modulation type (FM / QM / AM) , the corresponding unit is displayed (kHz / Rad / %)



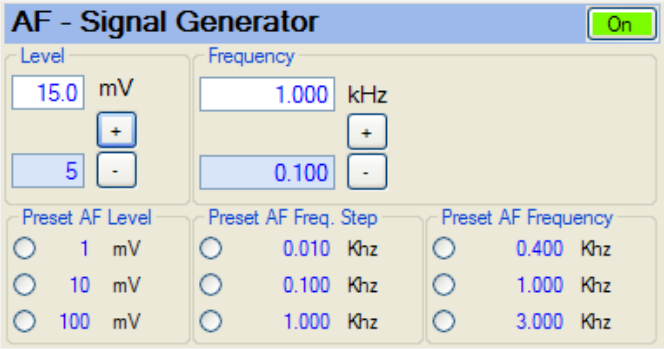
For two tone measurements (SMFP2 only) a second internal modulator can be activated (400 Hz or 1000 Hz). When activated, its modulation value is displayed in green on the screen.

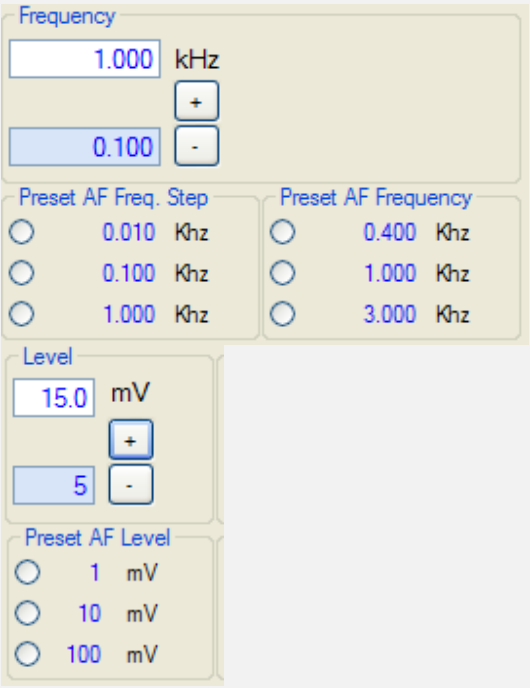


Click on 

to get to the “Other modulation” screen. Apart from the 2nd internal modulator, also the external modulation type and value can be set. Please note, that the type depends of the modulation type of the 1st modulator (not all combinations are possible)

5.4.2. Main settings for AF Frequency and Level





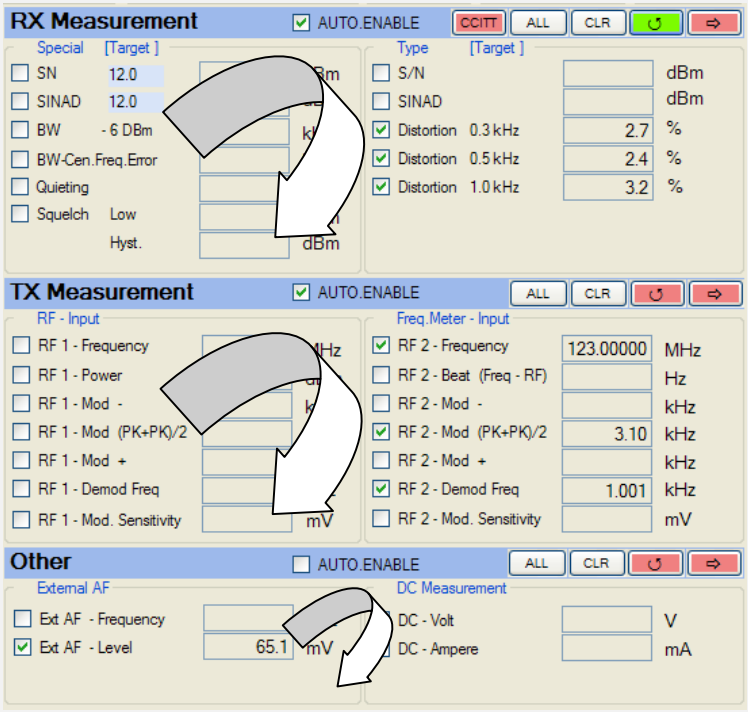
The RF modulation frequency can be set by means of the AF frequency setting.

Use the + and - buttons to add or subtract a predefined step value (as listed in the blue box) .Also predefined value can be used.

The AF level can also be adjusted, directly, via preset values or predefined steps..

The AF Level can only be adjusted if the AF-Signal Generator has been enable (Click on On to make it activate it . On) .

5.5. Measurement selection area



Note: Only one single or continuous measurement run can be active at the time.

Three sections (RX / TX / OT) are available for doing measurements.

Single Measurement Run: all selected measurements are run only once.

Continuous Measurement Run: all selected measurements are run sequentially and continuously.

Automatic Measurement run All selected measurements wil be performed for a whole range of variations (e.g. a predefined frequency range)

Only in case of a fully automated measurement run all measurement sections can run sequentially for the desired range (selected by "AUTO-ENABLE"

(De)activates the CCITT filter as used on receiver test measurements

(De)selects all measurements available in the relevant section.

Clears all measurements done in the relevant section. Any measurement remains on the screen, unless cleared or overwritten by a new measurement.

If any continuous measurement run is being processed it is not possible to start any other measurement run (single, continuous or automatic)

(De) activates a continuous measurement run. This means that all selected measurements (with checkbox selected), will be execute sequentially and continuously in the relevant section. It only stops, when it is de-activated again.

Please note that after de-activating it , the last measurement run will first be fully completed.

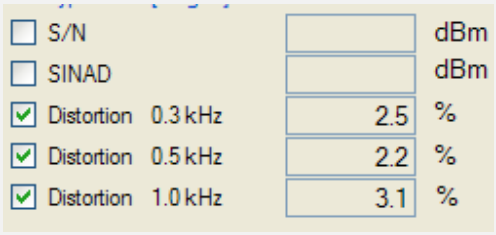
Only when 

in the general menu section is pressed, all measurements will be immediately aborted.

If in the general menu section  is pressed to  . It will hold the measurement (as indicated by) until the button is pushed again to resume.

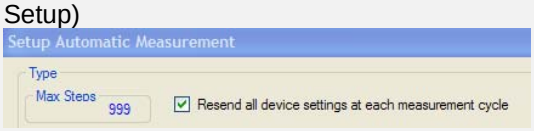
Will trigger a single measurement run for all measurements selected measurements. When finished, its color comes red again and other measurements can be selected again.

If any single measurement run is being processed it is not possible to start any other measurement run (single, continuous or automatic)



Select a measurement, by selecting the relevant “checkbox”. Only if selected it is subject to a measurement

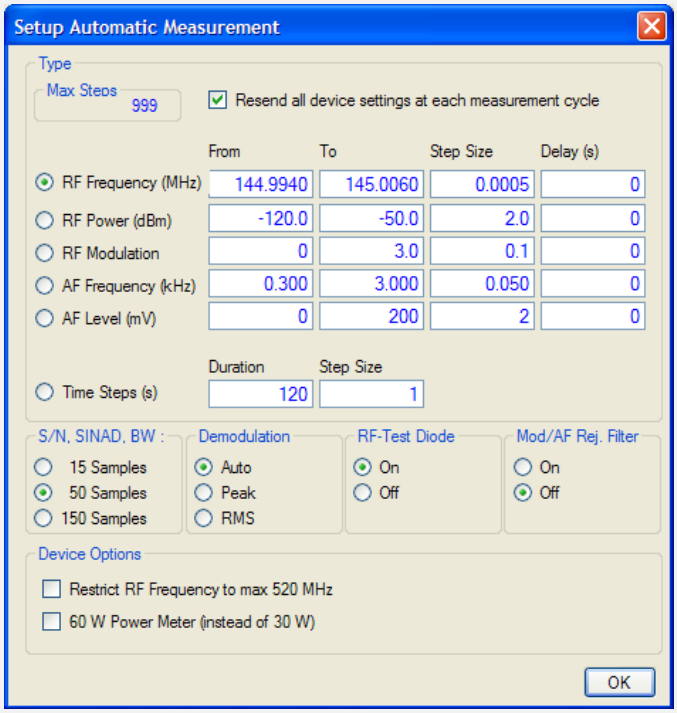
Note : New device setting are only activated when a measurement cycle has been fully completed (even you could manually change a setting, it will not be considered in the measurements done, as the relevant device setting will be re-send (unless not setup in the “Auto Setup” screen (settings -> Auto Setup)



For setup and starting an automatic measurement run see section 5.6

5.6. Setup of Automatic Measurements

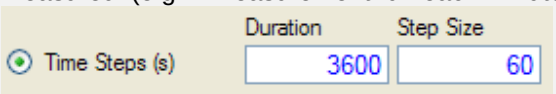
Select the “Settings -> Auto Setup” from the menu bar. The following screen will appear.

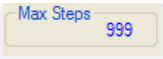


Five different variations can be selected, however only one variant can be active:

- RF Frequency (e.g. useful in sensitivity measurements)
- RF Power
- RF modulation
- AF Frequency
- AF Level

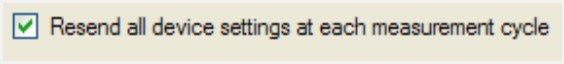
Alternatively it is also possible to select a “time range”. This way, variations over time can be measured (e.g. 1 measurement run each minute over a period of 1 hour)



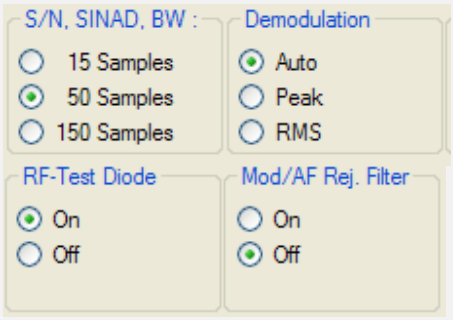


Can be used to restrict (as safeguard) the maximum number of runs (e.g. when step size is taken too small)

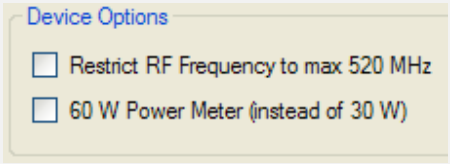
Any blue value can be adjusted by clicking on it.



New device setting are only activated when a measurement cycle has been fully completed (even you could manually change a setting, it will not be considered in the measurements done, as the relevant device setting will be re-send (unless not setup in the “Auto Setup” screen (settings -> Auto Setup)



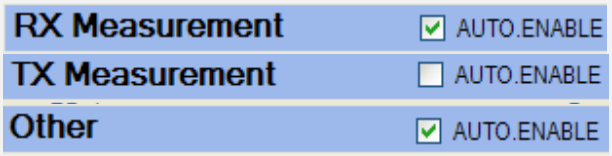
Some SMFP/SMFP2 related settings can be influenced. Please read it’s manual for further explaination.

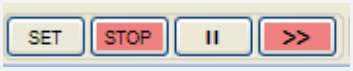


Use these setting to align the software, with the actual device options. Supported are:
SMFP-B2 1 Ghz Frequency Extension
SMFP2B3 60 W Power Meter (instead of 30 W)

5.7. Running an Automatic Measurements Run

For an automatic measurements run only those sections are relevant for which the “AUTO-ENABLE” check box is selected.

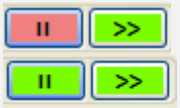


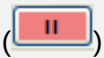


To setup the type of automatic measurement, the range of variation, including the step size. Also some specific device settings are defined here.

To start the automatic measurement run, push on 

. The measurements will be setup and started (and button will become green).



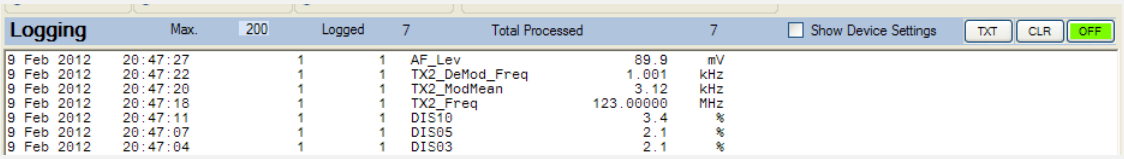
With the hold (

) button, the measurement can be set in hold (and button becomes green). To resume click gain on this button.

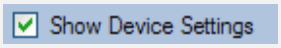
With the Stop button, all active measurements will be deactivated (from the software point of view). Also the GPIB channel will be closed. The software will send an reset command to the device.

However, as the SMFP/SMFP2 might be running an active measurement, synchronization issues might occur. The software might be a bit slow then. Best is then to switch-off the SMFP2, to get it setup in its initial state.

5.8. Logging Section



The logging function enables logging of all measurements. This could be any measurements part of an automated measurement run, single or continuous measurement .The maximum number of possible logging events is restricted (max. 999). The actual number of logged measurements and the total of processed measurements (since last clearing) is also visible in the header line.
!



Will show the device settings in the log.

RF Frequency (MHz) / RF Power (dBm) / Modulation Type / Modulation Depth (khz/Rad/%) / AF Frequency (kHz) and Level (mV)

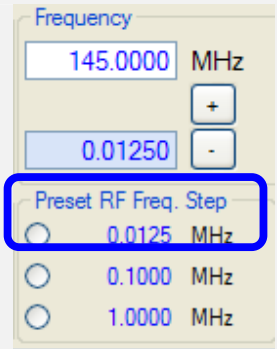
This button triggers the download of the whole logging to a file of your choice (.txt format)

Clears the whole logging.

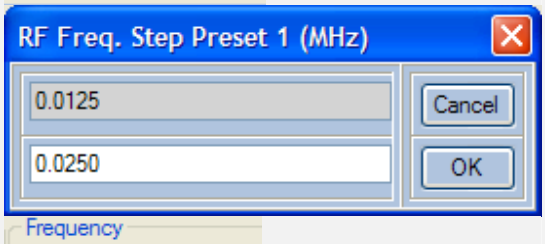
Activates or deactivates the logging

5.9. Entering new values

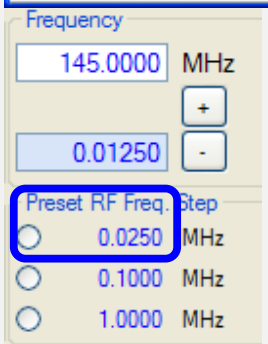
All the **blue** values can be edited. For example it is possible to change the step size and to save it into your own configuration file

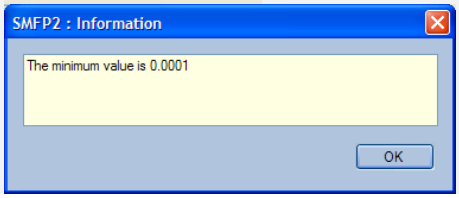


Click with your cursor on the (blue) text



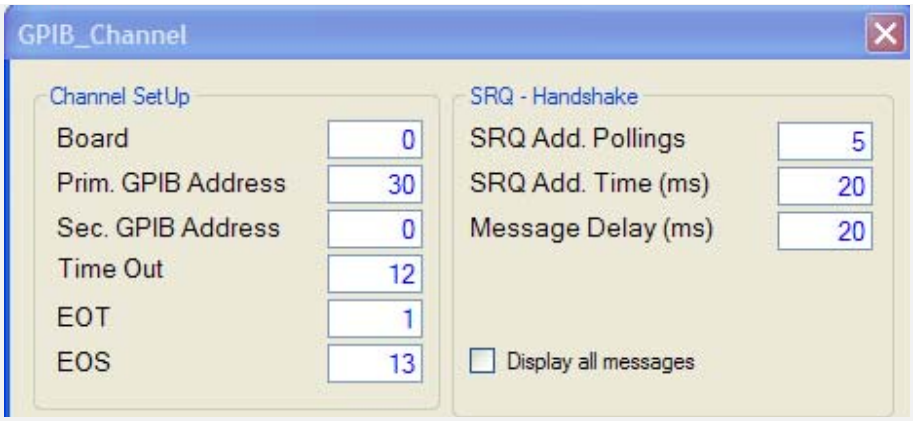
Enter the new value. Click on Ok (or push enter on the Key Board). A check on maximum and minimum values is performed. If all ok the value will be updated in the screen

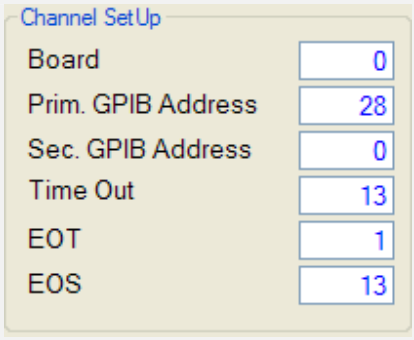




On error a message like here could occur.

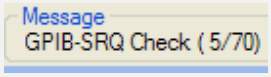
6. GPIB Setup





Adjust the cannel setting of your GPIB device. The address is according to device default specifications of SMFP2 is (primary address SMFP2 = 30).

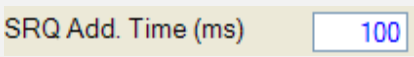
See your NI GPIB card for further information. Some relevant Time Out values are
12 = 3 sec
13 = 10 sec.



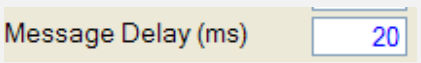
(5 checks of maximum 70 have been executed)

After sending a measurement command, the RCS will check for the Service Request Signal of the SMFP2 to come high. For this it will check the SRQ line periodically (serial polling). Internally some maximum number of checks (polling's) has been setup per measurement (e.g. a Bandwidth measurement can take up to 40..60 sec, as compared to a AF level, which completes in just a second). The progress can be displayed in the message bar (if "display all messages is selected"). If the maximum number is exceeded, the RCS will try to proceed with the next measurement.

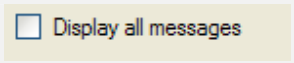
If these default values are set too tight (e.g. in case of time taking bandwidth measurements), they can be increased. For this, increase the number of additional Service Request ("SRQ Add.Pollings").



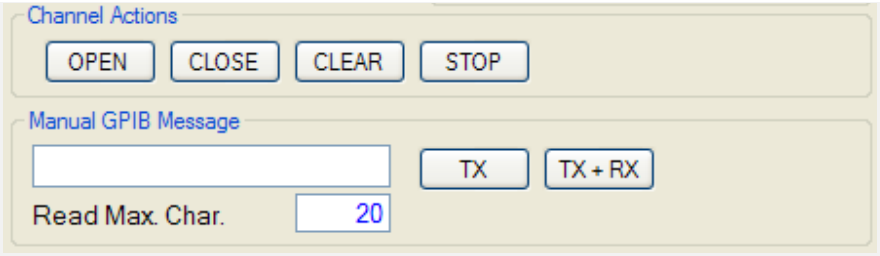
Another way of increasing the time to wait for a measurement to finish is to increase the time between two checks. Here the additional time can be entered (in ms). When taken too long, it dramatically can influence performance.

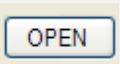


Any activity on the GPIB channel will be displayed in the message bar. This can go very fast. For testing purposes it is possible to delay the messages (say to 500 ms – 1000 ms) so that they can be easily read. However, this will of course delay the measurements at hand.

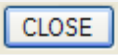


If selected, more information will be given in message bar (e.g. number of serial polls being executed)

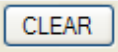




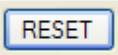
Open GPIB communication with device. Device is reset to initial state and software setting is aligned as much as possible with the device.



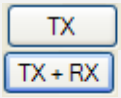
Close GPIB communication with device



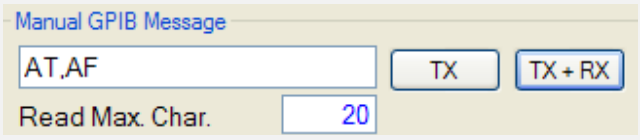
Clear device, channel remains open



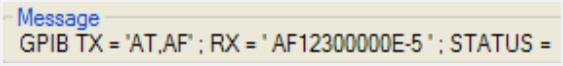
Not really a GPIB action, but resets all measurements being executed. Needed to reset software when it is in unexpected or uncontrollable state.



Used to manually sent a command to the device (TX no need to wait for answer, or TX when a measurements needs to be made). E.g. TX+RX is used here to measure the level.



The received value is displayed in the relevant section of the main screen.

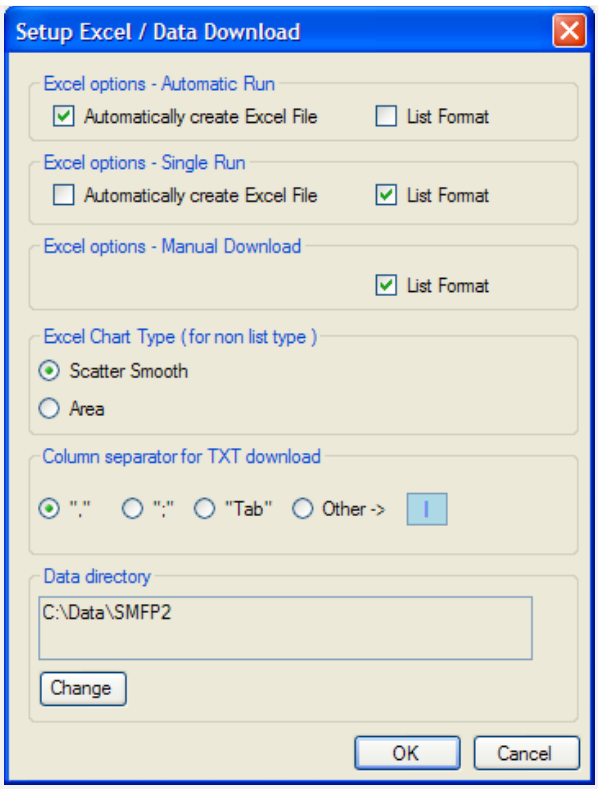


When processing the service request line it is checked if the address of the device triggering the command is the right device. Especially in a multi device setup it should be set to check the SRQ address.

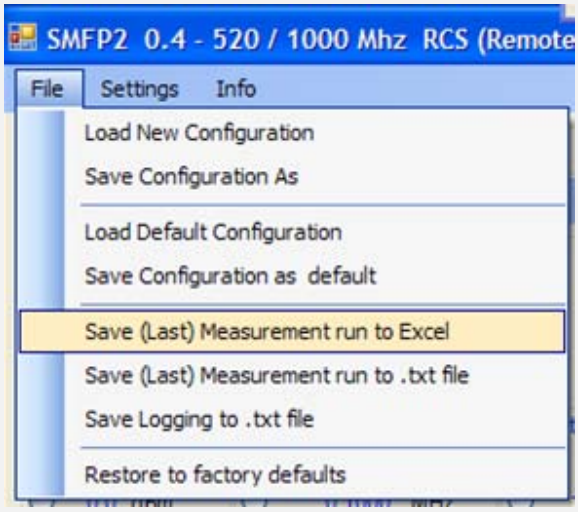
A maximum number of characters can be defined, to ready values back from the device. The value of 20 should normally not be changed, but might be useful for a specific manual measurement (or testing purposes)

7. Downloading Measurement & Logging Data

7.1. Download (last) measurement to Excel



Excel can also be manually started by selecting:



Excel can be started automatically in two cases

A) After a having done a single run / or ending a continuous run. . In case of a continuous run only the last full measurement cycle will be downloaded (automatically create of Excel not recommended)

B) After a fully automatic measurement run (recommended, unless you do not have Excel)

There are two formats available

1. List Format (one measurement per line)
2. Table (set of measurements per run)

In case of a table, automatically a chart in Excel will be created (two options available)

Only the last measurement run is downloaded into Excel. This can be a single measurement, the last full continuous measurement or a fully automated measurement run.

Each automatic or manual generated Excel file is saved with a fixed file name. A warning is issued when the file name already exists. Then it is possible to change the name.

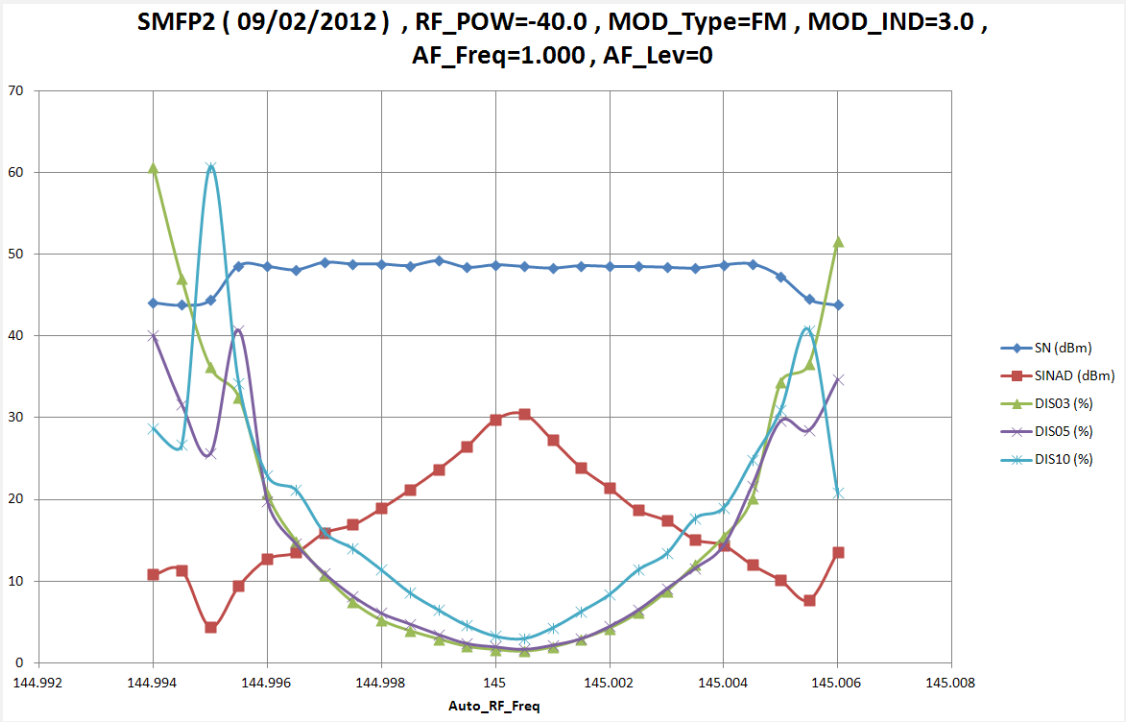
List Format :

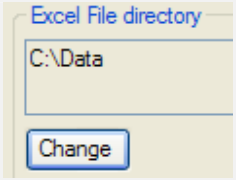
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	DATE	TIME	RUNID	RPTID	RF_Freq	RF_Pow	MOD_Ty	MOD_Inc	MOD_Fr	AF_Leve	Measur	Value	UoM
2	########	22:00:21	1	1	144.994	-40	FM	3	1	0	SN	44.1	dBm
3	########	22:00:24	1	1	144.994	-40	FM	3	1	0	SINAD	10.8	dBm
4	########	22:00:27	1	1	144.994	-40	FM	3	1	0	DIS03	60.7	%
5	########	22:00:31	1	1	144.994	-40	FM	3	1	0	DIS05	40.1	%
6	########	22:00:34	1	1	144.994	-40	FM	3	1	0	DIS10	28.7	%
7	########	22:00:38	2	1	144.9945	-40	FM	3	1	0	SN	43.8	dBm
8	########	22:00:41	2	1	144.9945	-40	FM	3	1	0	SINAD	11.3	dBm
9	########	22:00:44	2	1	144.9945	-40	FM	3	1	0	DIS03	47	%
10	########	22:00:48	2	1	144.9945	-40	FM	3	1	0	DIS05	31.6	%
11	########	22:00:51	2	1	144.9945	-40	FM	3	1	0	DIS10	26.7	%
12	########	22:00:55	3	1	144.995	-40	FM	3	1	0	SN	44.4	dBm
13	########	22:00:58	3	1	144.995	-40	FM	3	1	0	SINAD	4.4	dBm
14	########	22:01:01	3	1	144.995	-40	FM	3	1	0	DIS03	36.2	%
15	########	22:01:04	3	1	144.995	-40	FM	3	1	0	DIS05	25.6	%
16	########	22:01:08	3	1	144.995	-40	FM	3	1	0	DIS10	60.7	%

Table Format :

DATE	TIME	RUNID	RPTID	RF_Freq	RF_Pow	MOD_Ty	MOD_Inc	MOD_Fr	AF_Leve	SN (dBm	SINAD (d	DIS03 (%	DIS05 (%	DIS10 (%
########	22:00:21	1	1	144.994	-40	FM	3	1	0	44.1	10.8	60.7	40.1	28.7
########	22:00:38	2	1	144.9945	-40	FM	3	1	0	43.8	11.3	47	31.6	26.7
########	22:00:55	3	1	144.995	-40	FM	3	1	0	44.4	4.4	36.2	25.6	60.7
########	22:01:12	4	1	144.9955	-40	FM	3	1	0	48.6	9.4	32.5	40.7	34.2
########	22:01:29	5	1	144.996	-40	FM	3	1	0	48.5	12.7	20.7	19.8	22.9
########	22:01:47	6	1	144.9965	-40	FM	3	1	0	48.1	13.5	14.9	14.6	21.2
########	22:02:05	7	1	144.997	-40	FM	3	1	0	49	15.9	10.7	11	16
########	22:02:21	8	1	144.9975	-40	FM	3	1	0	48.8	16.9	7.4	8.2	14
########	22:02:37	9	1	144.998	-40	FM	3	1	0	48.8	18.9	5.2	6.1	11.4
########	22:02:52	10	1	144.9985	-40	FM	3	1	0	48.6	21.2	3.9	4.8	8.6

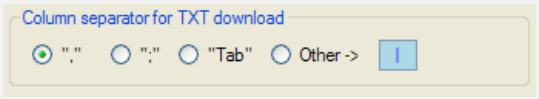
Only the Table format can be used for automatic graphics creation. E.g.





Will change the default Excel and .txt download directory

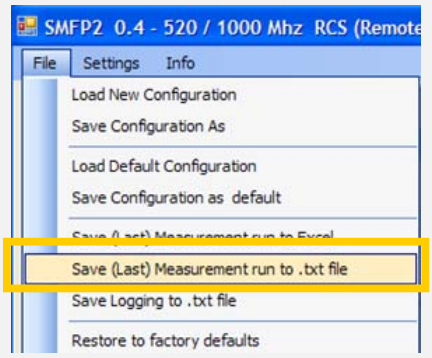
This button in the main screen will (re)generate an Excel file (again) based on the last measurement done.



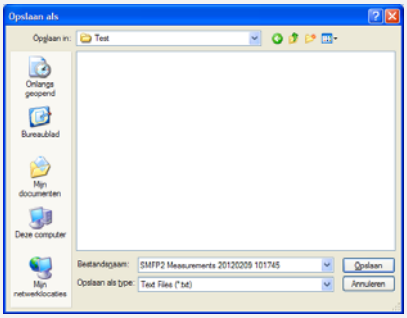
It is possible to set the column separator when downloading the data into a txt file.

Note. The logging download function will download the log as displayed (it will not use the separators shown here)

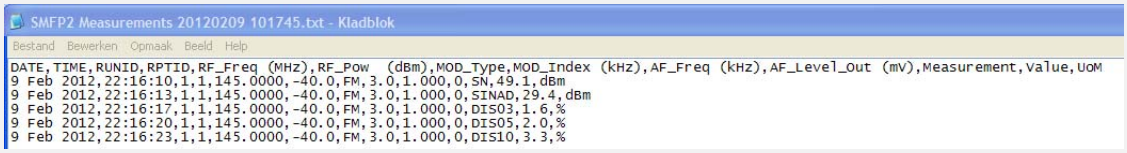
7.2. Download (last) measurement to .txt file



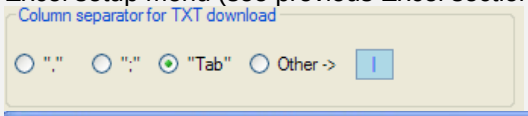
Starts the download to a user selectable .txt file.

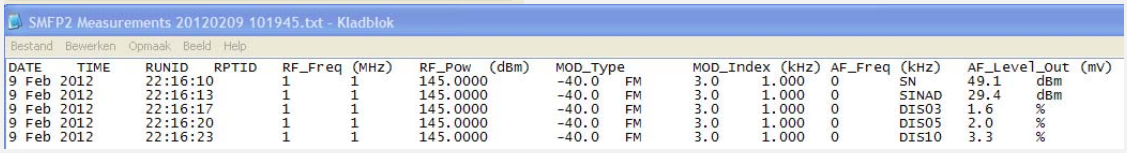


The file will be column separated, with column headers. The column separator can be manually selected from the Excel setup screen (in this case ",")



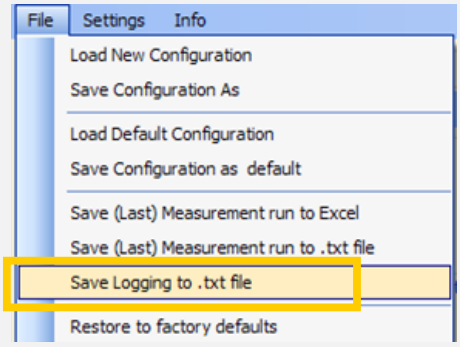
It is possible to adjust the column separator, with your own desired character. This is done in the Excel setup menu (see previous Excel section). In the below example "Tab" separated.





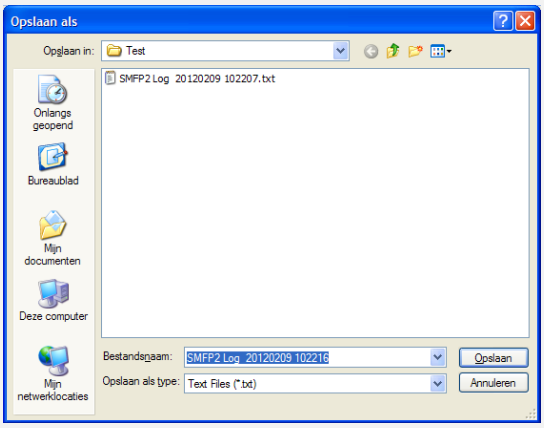
Note : It is not possible to save an empty Excel file (so without any measurement done)

7.3. Download of logging section



Or TXT from the logging section (Section G)

Starts the download to a user selectable .txt file.



Will save the logging to a user selectable .txt file. The column separator is **not used** here. The logging will be saved in the same format as displayed in the screen.

E.g.

Logging	Max.	200	Logged	5	Total Processed	5	
9 Feb 2012	22:21:54	1	1	DIS10		3.2	%
9 Feb 2012	22:21:51	1	1	DIS05		2.0	%
9 Feb 2012	22:21:47	1	1	DIS03		1.6	%
9 Feb 2012	22:21:44	1	1	SINAD		29.7	dBm
9 Feb 2012	22:21:41	1	1	SN		48.7	dBm

Will be shown in the .txt file as

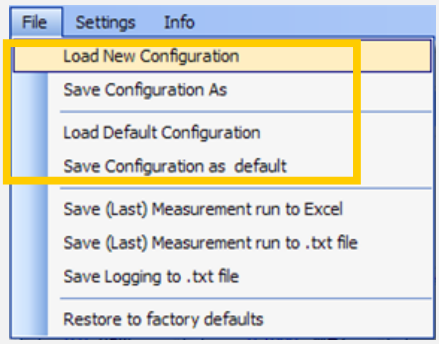
SMFP2 Log 20120209 102207.txt - Kladblok

Bestand Bewerken Opmaak Beeld Help

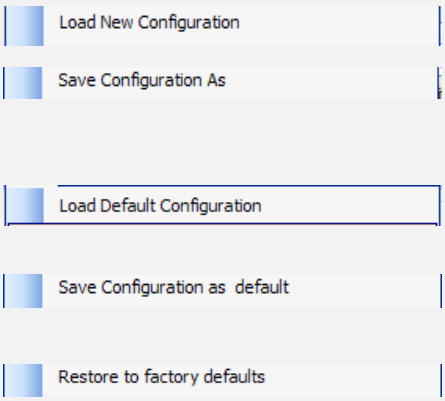
9 Feb 2012	22:21:54	1	1	DIS10	3.2	%
9 Feb 2012	22:21:51	1	1	DIS05	2.0	%
9 Feb 2012	22:21:47	1	1	DIS03	1.6	%
9 Feb 2012	22:21:44	1	1	SINAD	29.7	dBm
9 Feb 2012	22:21:41	1	1	SN	48.7	dBm

Note : It is not possible to save as empty log.

8. Saving and using configuration files



All the configuration settings can be saved and opened again. Saving will be done in a user selectable directory.



Opens a configuration file, previously saved.

Saves the configuration file, but file will not be used as default. Used to save and manage several configuration files

Opens the default configuration file (= file used at startup)

Saves the configuration file as default file. The file specified here will also used during startup of the tool.

Restores all values to initial values, including GPIB channel setup.

9. Appendix – Quick Start Guide

1. First of all make sure the GPIB connection to device is activated.

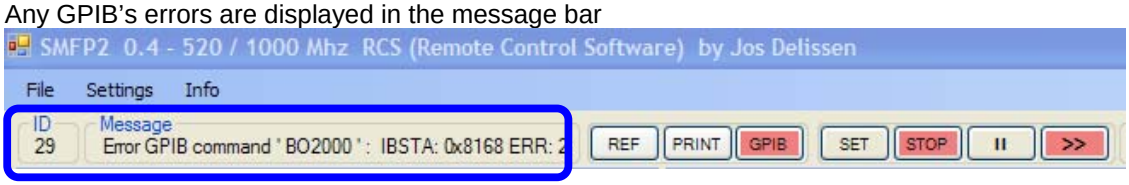
Push on 

. If everything is ok it becomes green. 

. If it does not become green check the connection to the device, its GPIB address setting or the mandatory NI GPIB card drivers.

Make sure the proper GPIB hand-shake configuration is made (see Chapter 6). To start we recommend to use

Any GPIB's errors are displayed in the message bar



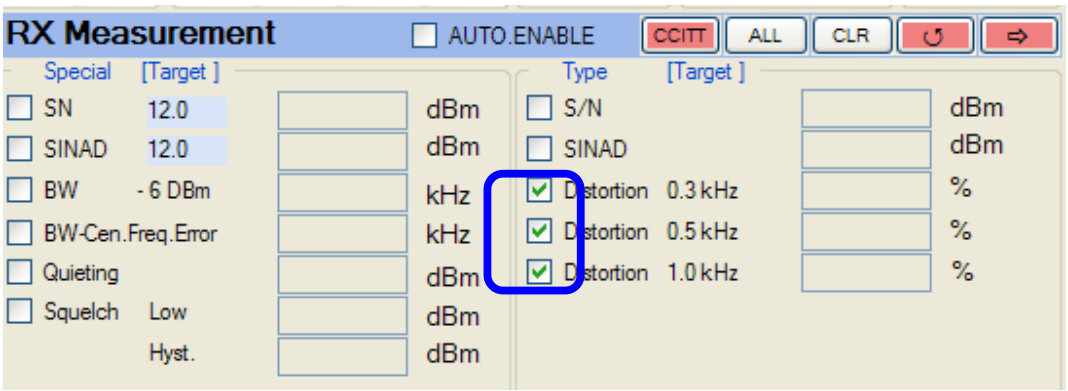
Reset any severe error's with the 

button (the GPIB channel cannot be opened if any error occurs)

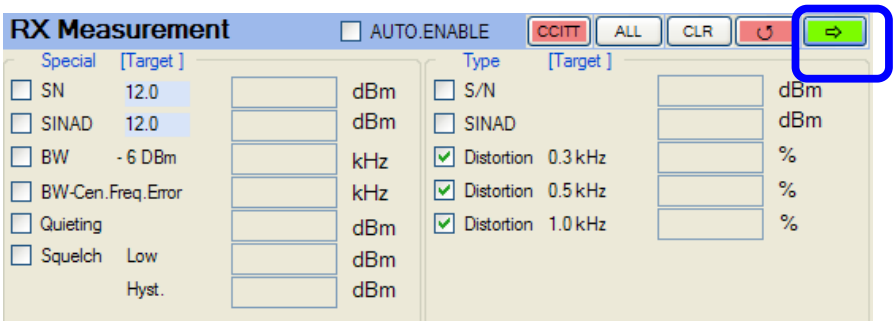
9.1. Perform a single measurement run.

For example: perform a Noise measurement for a receiver (RX Measurement)

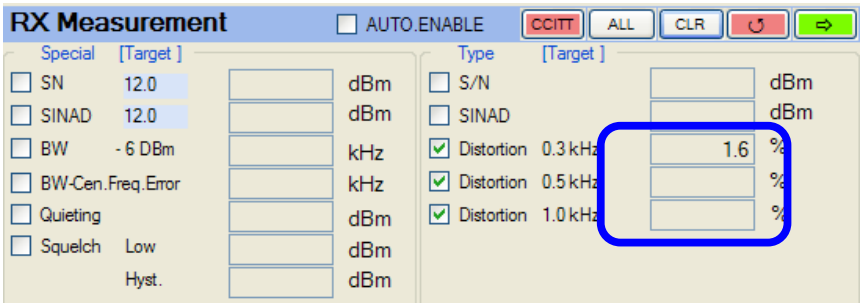
1. Select one or more measurements



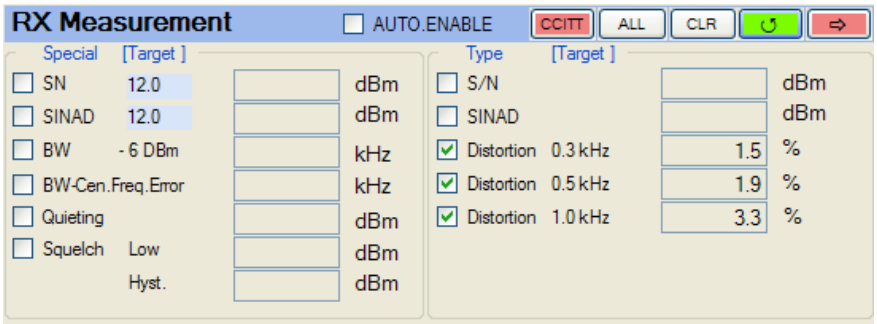
2. Press "⇨" to start a single measurement run



3. All measurements will take place. As soon as a measurement is completed its value will be shown.

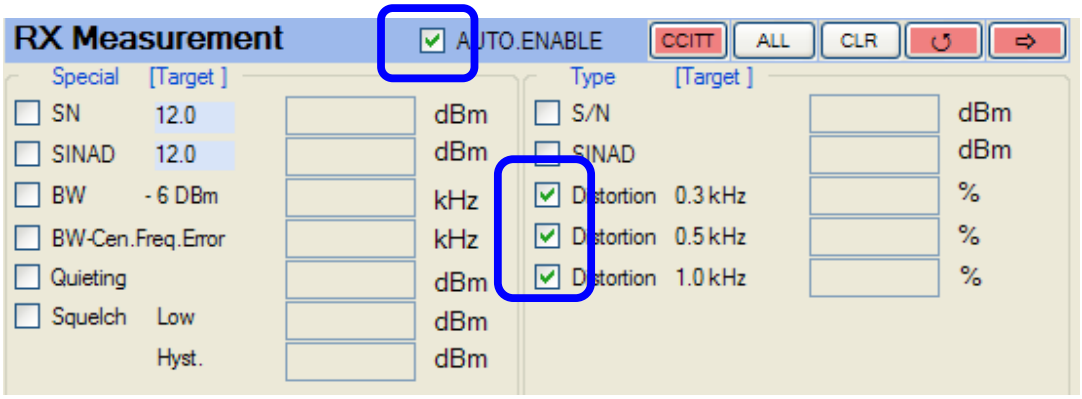


Note: To continuously repeat the same measurement click on ↺, then the same measurement will repeat itself. Any device changes (frequency, demodulation mode etc) will be effective as soon as a cycle of all selected measurements has finished. This is done to prevent disturbance of any ongoing measurements.



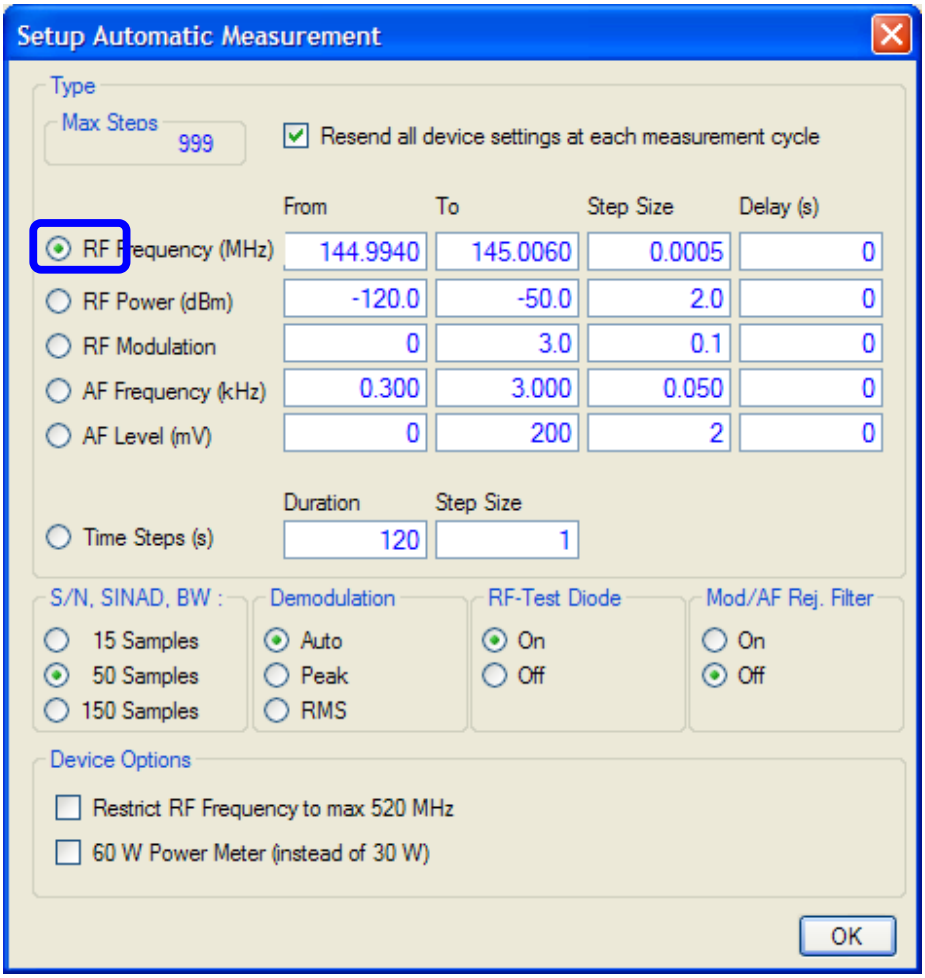
9.2. To make automated run of measurements

1. Select the requested measurement and enable the section (AUTO.ENABLE)



2. Make the required selection of frequency range (or Time Range). This can be done manually or using a predefined frequency range (or even a time range). For predefined ranges select the SET Button

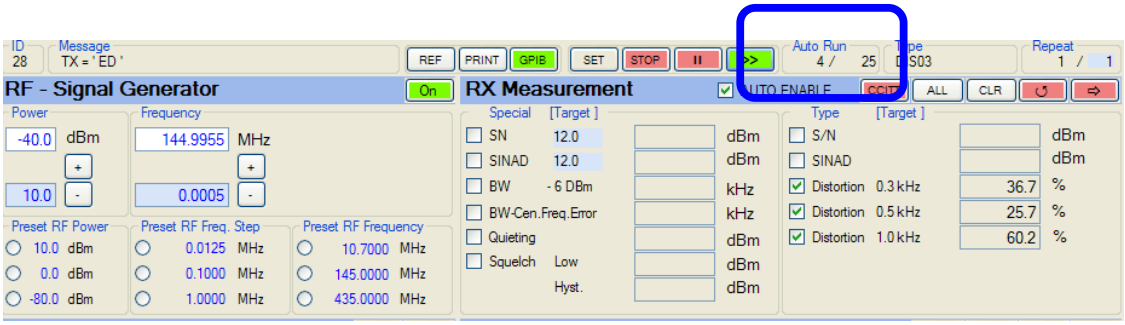
3. Make the required selection of frequency range (or Time Range). E.g.



(now 25 measurement runs will be calculated (145.006 – 144994) / 0.0005 + 1))

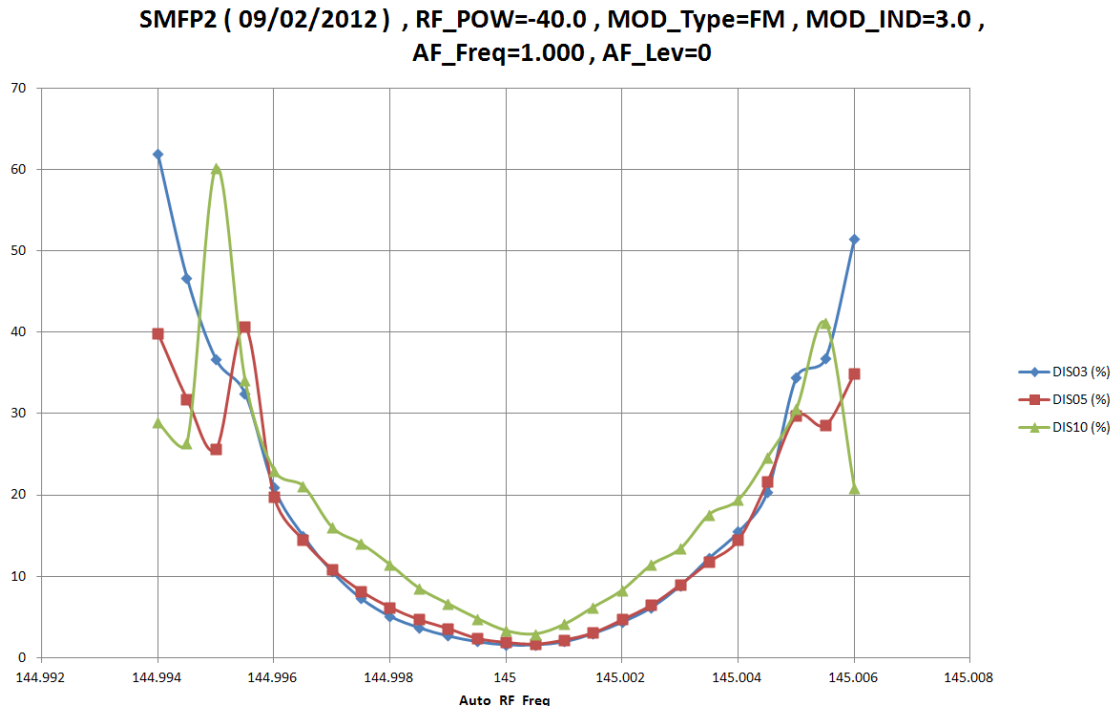
4. Close the screen and press >> Button

5. Now the whole measurements starts (the current measurement run is displayed in the screen as well as the total number of measurement runs planned)



6. The measurement can be temporarily stopped and restarted by the II button. With the “STOP” button, all measurements will be stopped. The GPIB channel will be closed down and the software will be set into its initial state.

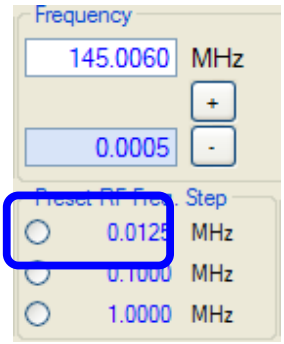
7. Depending on the Excel settings, Excel will start automatically to display all the measure values in one sheet, including a graphical representation.



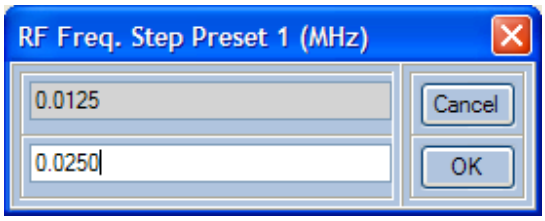
9.3. How to enter values in a box and save them?

All the **blue** values can be edited. For example it is possible to change the step size and to save it into your own configuration file

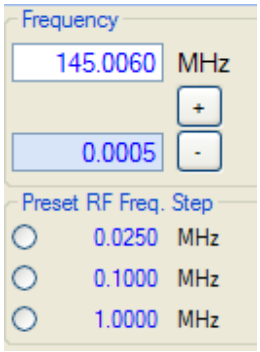
1. Click with your cursor on the (blue) text



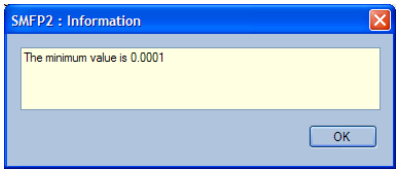
2. Enter the new value.



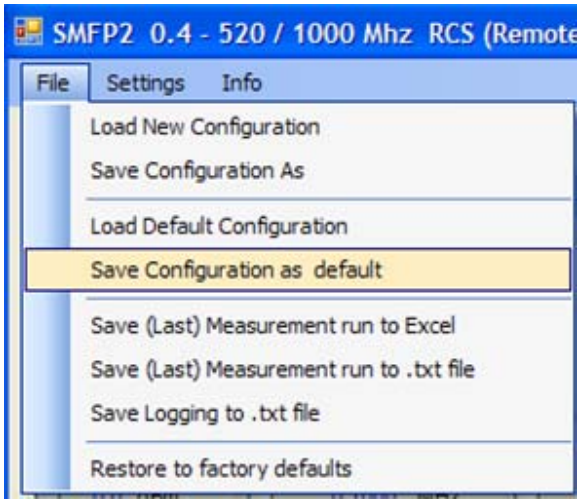
3. Click on Ok. A check on maximum and minimum values is performed. If all ok the value will be updated in the screen



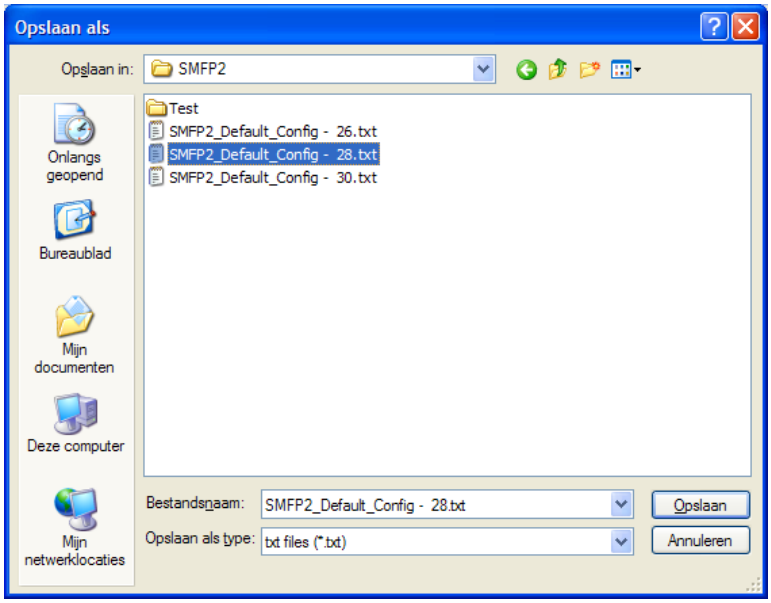
On error a message like below could occur.



4. To save your configuration. You can use the save buttons (e.g. save as your default configuration).



When using the first time you need to select an directory/filename. E.g.



The file name and directory will be remembered for next usage.